

Name.....Index No .....

232/2

PHYSICS

Paper 2

July/Aug 2014

2 Hours



## RABAI SUB-COUNTY PHYSICS MOCK EXAMINATION

### Instructions to candidates

1. This paper contains 2 sections. Section A and section B
2. Answer all the questions in section A and B in the spaces provided
3. All working and answers should be written on the question papers in the spaces provided
4. Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise
5. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

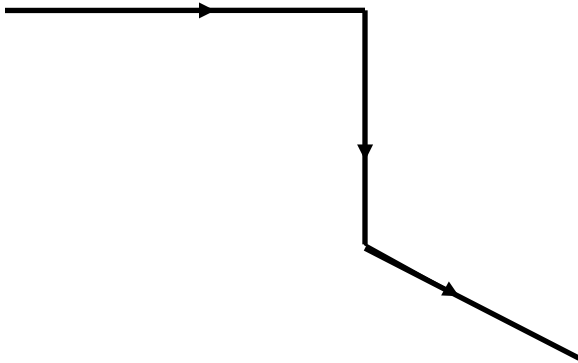
### **For Examiner Use Only**

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 -10	25	
B	12	12	
	13	10	
	14	12	
	15	13	
	16	08	
Total score		80	

**SECTION A (25 MARKS)**

**Answer all the questions in this section.**

- 1 Figure 1 shows the path of a ray of light. The ray was made to change direction using mirrors, but these have been left out.



Complete the diagram by placing the mirrors in exactly the correct position. [ 2 marks ]

- 2 The figure 2 shows an uncharged pith ball under the attraction of a charged ball.

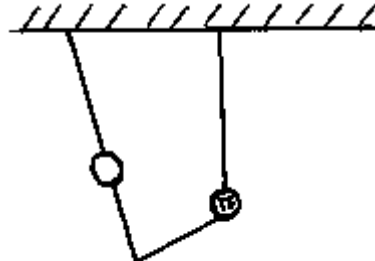


Figure 1

Pinballs

State and explain what would be observed after the two pith balls touch. (2marks)

3 When a bar magnet is placed near a steel needle, the needle is attracted. Explain this observation. [2marks]

4. The wave shown in figure 3 has a speed of 100m/s. Study it and answer the questions that follow.

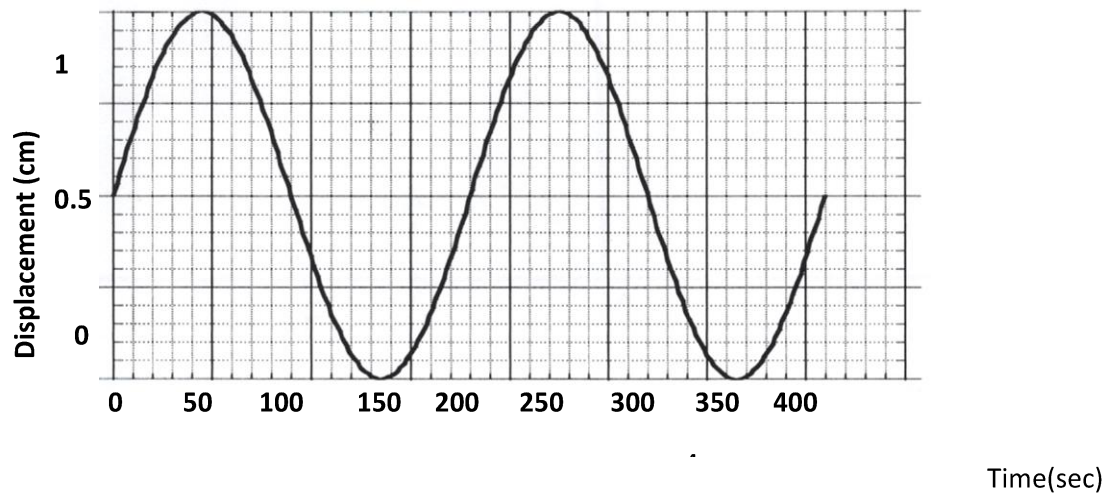
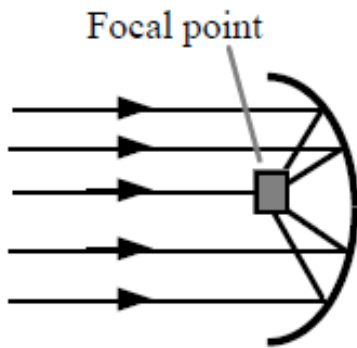


Figure 3

(a) What is the frequency of the wave (2marks)

(b) Calculate the wavelength of the wave. (2marks)

5 Figure 4 shows an effect of a concave mirror on parallel beam of rays.



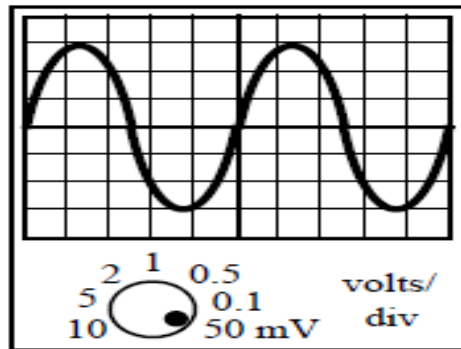
State one application of this characteristic of the mirror

[ 1 mark ]

6 Explain how an n-type semiconductor is formed.

[ 3marks ]

7 Figure 5 shows output traces of an ac output with the time base on.



Using the Y-gain settings shown, determine the peak to peak voltage.

[2 marks]

8. Figure 6 below shows a connection to the three pin plug. Use it to answer questions 8 a, and b.

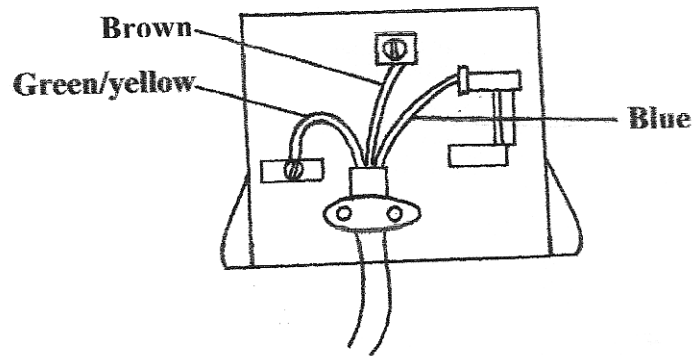
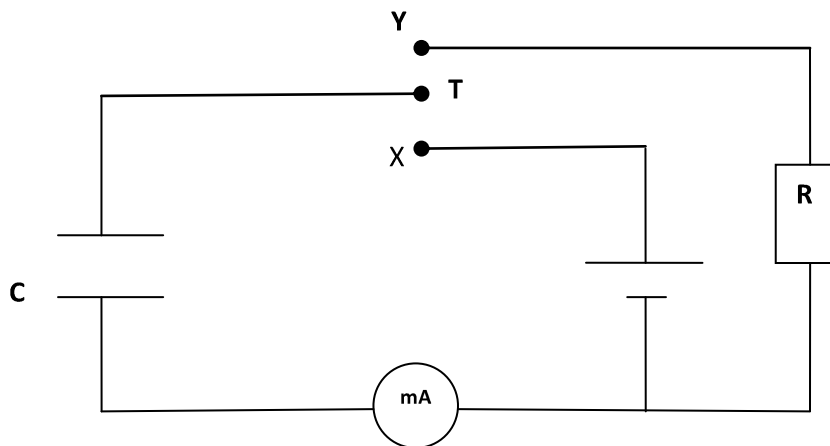


Figure 6

Identify two mistakes in this wiring.

[2marks]

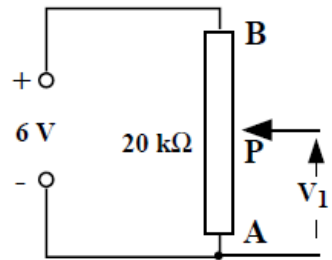
9.) A the circuit diagram shown in figure 7, T is a two way switch. Terminal T is connected to X and after some time to Y



Explain what is observed in the reading of the millimeter.

[3 marks]

- 10 Figure 8 shows a  $20\text{k}\Omega$  potentiometer AB in a circuit. The sliding contact, P, can be moved to any point along the potentiometer AB.



The potentiometer is adjusted to give an output voltage of  $3.5\text{V}$ . What is the resistance between points B and P. [3 marks]

- 11 State one use of ultraviolet radiation

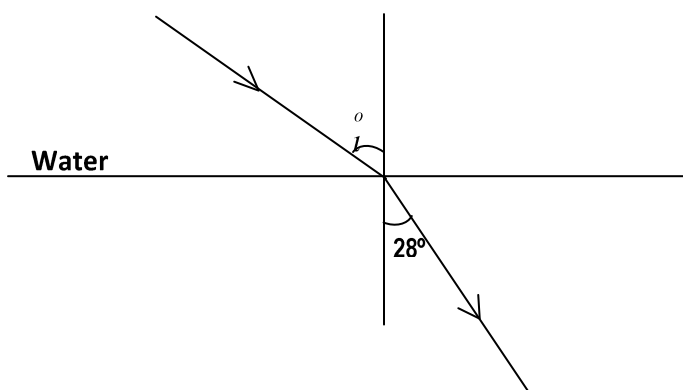
[1 mark]

SECTION B (55 MARKS)

Answer all the questions in this section in the spaces provided.

12 a) what is meant by 'total internal reflection' [2marks]

b) Figure 9 shows a ray of light travelling between water-glass interfaces.



i) Calculate the value of  $i$ . [Take the refractive indices  ${}_a n_g = 1.52$  and  ${}_a n_w = \frac{4}{3}$ .] (4 marks)

ii) The critical angle for a ray passing between the glass-water interfaces. [3 marks]

- c) Figure 10 shows an eye defect. Draw on the same figure a ray diagram to show how the defect is corrected using an appropriate lens. [3marks]

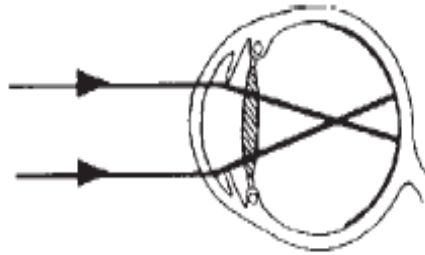


Figure 10

- 13.(a) Study the circuit diagram below and answer the questions that follow.

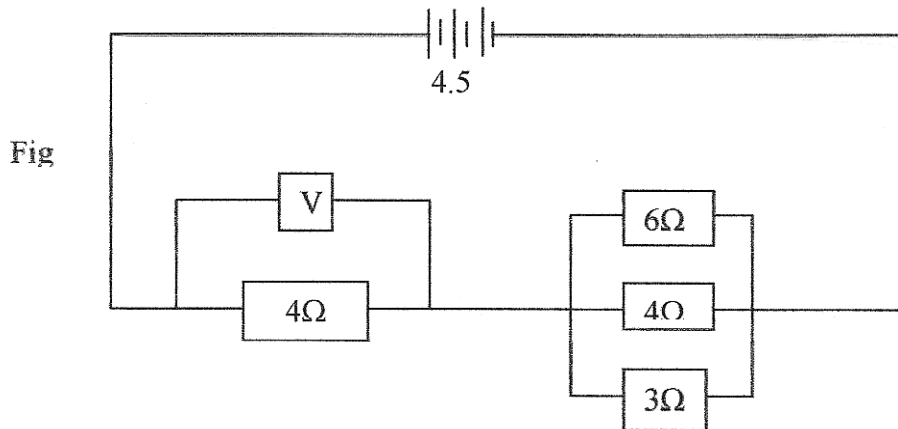


Figure 11

- (i) Calculate the effective resistance of the circuit. [3marks]

- (ii) Find the voltmeter reading. [ 3 marks]



(b) A cell drives a current of 3.2A through a  $2.8\Omega$  resistor. When it is connected to  $1.6\Omega$  resistor, the current that flows is 5A. Find the E.m.f. (E) and internal resistance of the cell. [4marks]

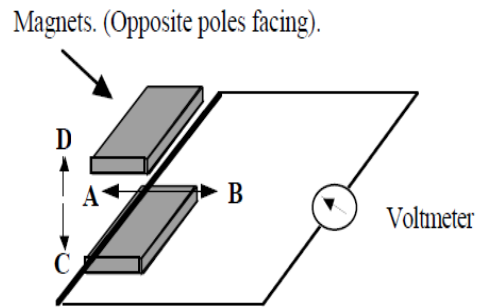
14 a) In an x-ray tube Explain how;

i) the x-rays are produced. [3marks]

ii the penetrating power of x-rays is controlled. [2 marks]

b) The energy of x-ray is  $2.089 \times 10^{-14}$  joules. Determine the wavelength of the x-rays produced. [Take speed of light =  $3.0 \times 10^8$  m/s and plank's constant is  $6.6 \times 10^{-34}$  Js,] [3marks]

c) Figure 12 shows two bar magnets arranged with opposite poles facing each other. A conductor connected to a centre zero -voltmeter is free between the poles of the magnet.



a) Explain what is observed in the voltmeter when the conductor is moved along;  
 I) AB [2marks]

II) CD [ 2 marks]

15 a) Define work function as used in photoelectric effect. [1 mark]

b) Figure 13 shows ultra violet light striking clean zinc placed on a positively charged leaf electroscope. The experiment was repeated with the electroscope negatively charged.

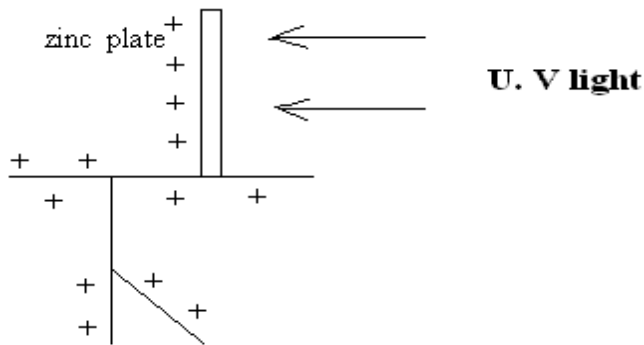


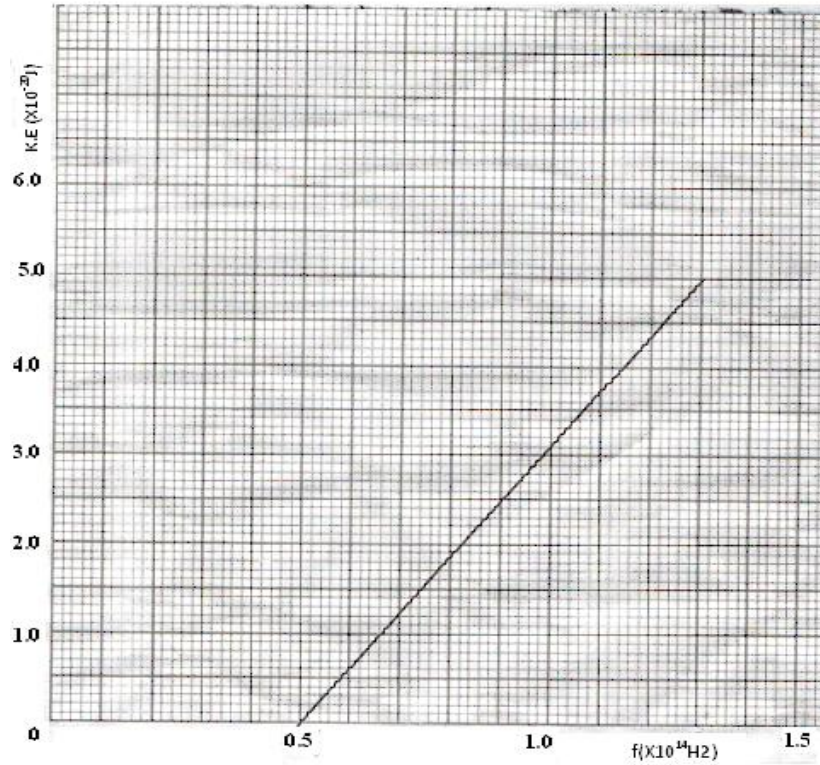
Figure 11

The leaf of the electroscope does not fall when it is positively charged but falls when it is negatively charged. Explain these observations. [4 marks]

c) State two factors that affect the photoelectric emission.

[2marks]

d) In an experiment on photoelectric, a metal surface was illuminated by light of different frequencies but of constant intensity. The maximum kinetic energy (K.E max) of the photoelectrons emitted for each frequency  $f$ , was measured. The graph below shows how the maximum kinetic energy varies with frequency  $f$ ,



Use the graph above and Einstein's equation of photoelectric effect to determine the value of;

i) Planck's constant [ 3marks]

ii) Work function of the metal surface. [3marks]

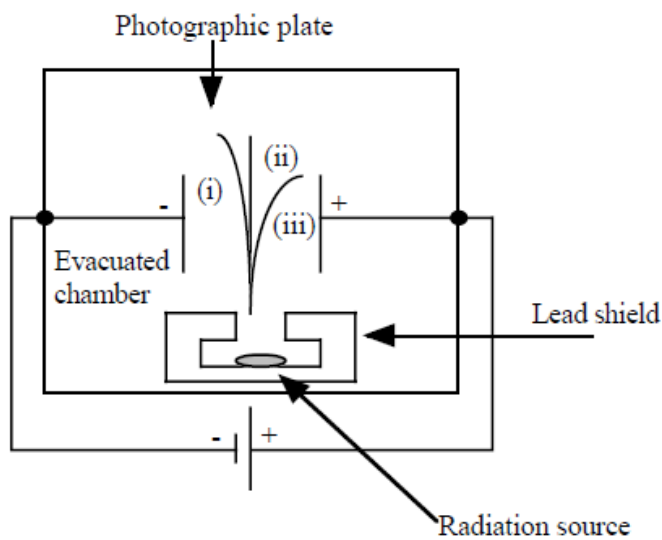
16 a) Explain what is meant by 'half-life' of a radioactive source. [ 1 mark ]

b) The following data was obtained from an experiment to determine the half life of a radioactive source:

Time (minutes)	0	20	40	60	80
Count rate (number of counts per minute)	100	60	45	30	20

Determine the half-life of the radioactive source [2 marks]

c) In an experiment, radiation from a sample of radium is passed through an electric field. It is split into three different components (as shown in the diagram below).



(i) Name the radiations labelled (i), (ii) and (iii) [2 marks]

(ii) Explain why radiation (iii) is deflected most. [1 mark]

(iii) Why is the experiment carried out in an evacuated chamber? [1 mark]

(iv) What is the purpose of the photographic film [1 mark]